UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/078,349	02/21/2002	Gianfranco Verbana	Q68569	5049

23373 7590 01/12/2005

SUGHRUE MION, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
SUITE 800
WASHINGTON, DC 20037

EXAMINER	
WANG, LEMING	

ART UNIT	PAPER NUMBER
2633	

DATE MAILED: 01/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/078,349	VERBANA ET AL.	
	Examiner	Art Unit	
	Leming Wang	2633	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 February 2002*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 2, 7, 9, 13, 15, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by *Iwasaki* (US patent No: 5,034,997).

Regarding claim 1, *Iwasaki* teaches that a wireless communication system (Col.1, lines 9-14) protected against outage, said system comprising:

a transmitter (Fig.3A) comprising a transmitter apparatus (15a, Fig.3A) designed to transmit radio signals; and

a receiver (Fig.3B and Fig.5) comprising a receiver apparatus (22, Fig.3B and 32, 33, Fig.5) designed to receive the transmitted radio signals,

wherein said transmitter (Fig.3A) comprises an additional transmitter apparatus (13a, Fig.3A), said additional transmitter apparatus being designed to transmit optical

signals through the air (Abstract and Col.4, lines 38-39); and said receiver (Fig.3B and Fig.5) comprises an additional receiver apparatus (23, Fig.3A and 34, Fig.5) being designed to receive the optical signals transmitted through the air (Abstract and Col.4, lines 38-39).

Regarding claim 2, *Iwasaki* teaches that a wireless communication system (Col.1, lines 9-14) protected against outage, said system comprising:
a transmitter (Fig.3A) comprising a transmitter apparatus (13a, Fig.3A) designed to transmit optical signals through the air (Abstract); and

a receiver (Fig.3B and Fig.5) comprising a receiver apparatus (23, Fig.3B and 34, Fig.5) designed to receive the through-air transmitted optical signals ((Abstract and Col.4, lines 38-39), wherein

said transmitter (Fig.3A) comprises an additional transmitter apparatus (15a, Fig.3A), said additional transmitter apparatus being designed to transmit radio signals; and said receiver (Fig.3B and Fig.5) comprises an additional receiver apparatus (22, Fig.3B and 32, 33, Fig.5), said additional receiver apparatus being designed to receive radio signals.

Regarding claim 7, *Iwasaki* teaches that a communication system according to claim 1, wherein said receiver apparatus (22, Fig.3B and 32, 33, Fig.5) designed to receive radio signals and said receiver apparatus (23, Fig.3B and 34, Fig.5) designed to receive through- air transmitted optical signals (Abstract and Col.4, lines 38-39) are

tuned at the transmission frequency of said transmitter apparatus designed to transmit radio signals (22 [resonance circuit], Fig.3B, Col.4, lines 58-61; 32, 33, Fig.5 and Col.6, lines 14-17; 52, 53, Fig.6 and Col.6, lines 6-10) and of said transmitter apparatus designed to transmit optical signals (34, Fig.5 and Col.6, lines 20; 62, 63, Fig.6 and Col.7, lines 19-22) through the air, respectively.

Regarding claim 9, *Iwasaki.* teaches that a transmitter (Fig.3A) for wireless transmitting signals to a corresponding receiver (Fig.3B), said transmitter (Fig.3A) comprising a transmitter apparatus (15a, Fig.3A) designed to transmit optical signals through air (Abstract, Col.4, lines 38-39), wherein the transmitter (Fig.3A) further comprises a radio transmitter apparatus (15a, Fig.3A) designed to transmit radio signal.

Regarding claim 13, *Iwasaki* teaches that a receiver (Fig.3A) for receiving wireless-transmitted signals (Fig.3A and 3B) from corresponding transmitter (Fig.3A), said receiver comprising a receiver apparatus (23, Fig.3B; 34, Fig.5) designed to receive through-air transmitted optical signals (Abstract and Col.4, lines 38-39), wherein it further comprises a radio receiver apparatus (22, Fig.3B; 32, 33, Fig.5) designed to receive radio signals.

Regarding claim 15, *Iwasaki* teaches that a receiver according to claim 12 and 14, respectively, wherein it further comprises a switching device (37, Fig.5 and Col.6,

Regarding claim 15, *Iwasaki* teaches that a receiver according to claim 12 and 14, respectively, wherein it further comprises a switching device (37, Fig.5 and Col.6, lines 21-39) to select one of said received optical and radio signals (37, Fig.5 and Col.6, lines 21-39).

Regarding claim 17, *Iwasaki* teaches that a receiver according to claim 14 and 17, respectively, wherein it further comprises:

a device designed to detect the received radio signal power value (126, Fig.14; 134, Fig.15; 145, Fig.16; Col 10. line 67-68, Col.11, lines 1-2, 24-37, 60-63); and

a device designed to detect the received optical signal power value (126, Fig.14; 134, Fig.15; 145, Fig.16; Col 10. line 67-68, Col.11, lines 1-2, 24-37, 60-63), and in that said switching device (37, Fig.5 and Col.6, lines 21-39) comprises changeover logical (37, Fig.5 and Col.6, lines 21-39; 138, Fig.15 and Col.11, lines 24-37) responsive to the power level (126, Fig.14; 134, Fig.15; 145, Fig.16; Col 10. line 67-68, Col.11, lines 1-2, 24-37, 60-63) of the received optical signal and radio signal.

3. Claims 1, 2, 8, 9, 12, and 13 are rejected under 35 U.S.C. 102(e) as being anticipated by *Willebrand et al.* (US patent No: 6,763,195).

Regarding claims 1, 2, 8, 9, 12, and 13, *Willebrand et al.* disclose an optical laser transmitter (108 or 110, Fig.3, and Col.4, lines 60-61), an optical laser receiver (88 or 90, Fig.3), a radio receiver and RF transmitter (58 or 68, Fig.3).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 3 - 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Iwasaki* (US patent No: 5,034,997) in view of *Dorren et al.* (US patent No: 5,854,986).

Regarding claim 3 and 4, *Iwasaki* teach that the receiver further comprises a switching device (37, Fig.5 and Col.6, lines 21-39).

Iwasaki differs from the claimed invention in that *Iwasaki* does not teach that a communication system according to claim 1 and claim 2, respectively, wherein said transmitter further comprises a splitter. However, *Dorren et al.* from the same field of endower teach using a splitter, such as Wilkinson power splitter, in cellular communication system (56, 58, 60, 62, Fig.2 and Col.4, lines 52-59). The splitter, such as Wilkinson power splitter, can be used in the high power driving and output system, as discussed by *Dorren et al.*, for providing signal a larger propagation range. Accordingly, it would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate a splitter, such as the one of *Dorren et al.,* in the modified wireless communication system to split the signal into two identical parts for RF modulator and Electrical/optical converter to drive RF transmitter or/and laser transmitter simultaneously with better split output signals.

Regarding claim 5 and 6, *Iwasaki* further teach that a communication system according to claim 3 and 4, respectively, wherein the system further comprises:

a device designed to detect the received radio signal power value (126, Fig.14; 134, Fig.15; 145, Fig.16; Col 10. line 67-68, Col.11, lines 1-2, 24-37, 60-63); and

a device designed to detect the received optical signal power value (126, Fig.14; 134, Fig.15; 145, Fig.16 ; Col 10. line 67-68, Col.11, lines 1-2, 24-37, 60-63),

said switching device (37, Fig.5 and Col.6, lines 21-39) comprising changeover logic (138, Fig.15 and Col.11, lines 30-37) responsive to said power values (126, Fig.14; 134, Fig.15; 145, Fig.16 ; Col 10. line 67-68, Col.11, lines 1-2, 24-37, 60-63) of the radio signal and of the optical signal.

6. Claims 12, 14, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Iwasaki* (US patent No: 5,034,997) and in view of *Willebrand et al.* (US patent No: 6,763,195).

Regarding claim 12, *Iwasaki* teaches that a receiver (Fig.3B) for receiving wireless-transmitted signals (Fig.3A and 3B) from corresponding transmitter (Fig.3A), said receiver comprising a receiver apparatus (22, Fig.3B; 32, 33, Fig.5) designed to receive radio signals, wherein it further comprises optical receiver apparatus (23, Fig.3B; 34, Fig.5) designed to receive optical signals through the air (Abstract and Col.4, lines 38-39).

Iwasaki differs from the claimed invention in that *Iwasaki* does not teach the transmitter further comprises a laser receiver. However, *Willebrand et al.* from the same field of endower disclose an optical laser receiver (88 or 90, Fig.3). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate the laser receiver, as disclosed by *Willebrand et al.*, into the modified communication system of *Iwasaki* in order to achieve an hybrid wireless optical and radio frequency communication system with higher transmission data rate and greater reliability under varying atmospheric conditions.

Regarding claim 14, *Iwasaki* further teaches that a receiver according to claim 12, wherein it further comprises a switching device (37, Fig.5 and Col.6, lines 21-39) to select one of said received optical and radio signals (37, Fig.5 and Col.6, lines 21-39).

Regarding claim 16, *Iwasaki* further teaches that a receiver according to claim 14, wherein it further comprises:

a device designed to detect the received radio signal power value (126, Fig.14; 134, Fig.15; 145, Fig.16; Col 10. line 67-68, Col.11, lines 1-2, 24-37, 60-63); and a device designed to detect the received optical signal power value (126, Fig.14; 134, Fig.15; 145, Fig.16; Col 10. line 67-68, Col.11, lines 1-2, 24-37, 60-63), and in that said switching device (37, Fig.5 and Col.6, lines 21-39) comprises changeover logical (37, Fig.5 and Col.6, lines 21-39; 138, Fig.15 and Col.11, lines 24-37) responsive to the

power level (126, Fig.14; 134, Fig.15; 145, Fig.16; Col 10. line 67-68, Col.11, lines 1-2, 24-37, 60-63) of the received optical signal and radio signal.

7. Claims 8, 18-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Iwasaki* (US patent No: 5,034,997) in view of *Dodley et al.* (US patent No: 5,966,229).

Regarding claim 8, *Iwasaki* teaches that a transmitter (Fig.3A) for wireless transmitting signals to a corresponding receiver (Fig.3B), said transmitter comprising an optical radiator transmitter apparatus (13a, Fig.3A) designed to transmit optical signals, wherein the transmitter further comprises a radio transmitter apparatus (15a, Fig.3A) designed to transmit radio signals through the air (Abstract and Col.4, lines 38-39).

Regarding claim 18, *Iwasaki* teaches that a method for wireless, transmitting/receiving signals (Col.1, lines 9-14) in a manner protected against outage, said method comprising the steps of:

in transmission, receiving a signal to be transmitted (11, 12, Fig.3A) sending said signal to be transmitted to a radio modulator (12 and Q2 in 15a , Fig.3A) and providing such a signal to an antenna (17a, Fig.3A) for transmitting radio signals;

in reception, receiving said radio signals through a receiving antenna (31, Fig.5), wherein the method further comprises the steps of:

in transmission, providing a copy of said signal to be transmitted also to an electrical/optical converter (12 and Q1 in 13a, Fig.3A) and to drive an optical radiator to emit optical signal through air.

in reception, receiving said signal (34, Fig.5) transmitted by optical signal radiator and selecting one of said radio signal and said optical signal (37, Fig.5 and Col.6, lines 24-31).

Regarding claim 19, *Iwasaki* teaches that a method for wireless transmitting/receiving signals in a manner protected against outage, said method comprising the steps of:

in transmission, receiving a signal to be transmitted (11, 12, Fig.3A), sending said signal to be transmitted to an electrical/optical converter (12 and Q1 in 13a, Fig.3A).

in reception, receiving said signal transmitted (Fig.3B) by means of the optical signal radiator, wherein the method further comprises the steps of:

in transmission, providing a copy of said signal to be transmitted to a radio modulator (12 and Q2 in 15a, Fig.3A) and providing such a signal to an antenna (21, Fig.3B; 31, Fig.5) for the transmission of radio signals,

in reception, receiving said radio signals through a receiving antenna (21, Fig.3B; 31, Fig.5) and selecting one of said radio signal and said optical signal.

Iwasaki differs from the claimed invention in claims 8, 12, 18, and 19:

in claim 8, *Iwasaki* does not teach that the transmitter further comprises a laser transmitter,

in claim 18, *Iwasaki* does not teach using a laser emitter to form a laser beam

and transmitting such a signal through said laser beam, and receiving said signal transmitted through said laser beam,

in claim 19, *Iwasaki* does not teach that sending said signal to a laser emitter to form a laser beam and transmitting said signal by means of said laser beam, and receiving said signal transmitted by means of the laser beam.

However, *Dodley et al.* from the same field of endower teach a laser transmitter used in free space optical communication. *Dodley et al.* describe the free optical communication system with optical transmitter and receiver, and detail information of the laser transmitter including laser diode, laser optics, and control circuits, which is used to adjust wavelength and power output of laser source to fit varying weather conditions. Accordingly, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate a laser as, it is taught by *Dodley et al.*, in the wireless communication system modified by *Iwasaki* to achieve the transmission of optical signal to a corresponding receiver in order to optimize the transmission of laser beam in free space and increase transmission distance.

Regarding claims 20 and 21, *Iwasaki* further teaches that according to claim 18 and 19, respectively, wherein said step of selecting one (37, Fig.5 and Col.6, lines 21-39; 138, Fig.15 and Col.11, lines 30-37) of said radio signal and said optical signal comprises the step of detecting the power level (126, Fig.14; 134, Fig.15; 145, Fig.16; Col 10. line 67-68, Col.11, lines 1-2, 24-37, 60-63) both of the received radio signal and of the received optical signal.

8. Claims 22, 23, 24, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Iwasaki* (US patent No: 5,034,997) and in view of *Dodley et al.* (US patent No: 5,966,229) as applied for claims 18-21 above and further in view of *Willebrand et al.* (US patent No: 6,763,195).

Regarding claims 22, 23, 24, and 25, as discussed above, *Iwasaki* teaches the information about selection (37, Fig.5 and Col.6, lines 21-39; 138, Fig.15 and Col.11, lines 30-37) of the radio signal and the optical signal depending on the power level of said radio signal and said optical signal (126, Fig.14; 134, Fig.15; 145, Fig.16; Col 10. line 67-68, Col.11, lines 1-2, 24-37, 60-63).

The modified communication system of *Iwasaki* and *Dodley et al.* differs from the claimed invention in that it does not clearly disclose a method wherein the step of selecting one of said radio signal and said optical signal comprises the step of outputting the radio signal from the receiver unless its power level at the receiver is basically corresponding to a threshold power level. However, *Willebrand et al.* teach using threshold level to determine whether the optical path has failed or degraded to the point where it is unreliable of ineffective (Col.5, line 63 to Col.6 line 7) in a hybrid wireless optical and radio frequency communication link. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate the information of threshold disclosed by *Willebrand et al.* into the modified communication system of *Iwasaki* and *Dodley et al.* in order to achieve an optimized

hybrid wireless optical and radio frequency communication transmission under atmospheric conditions that cause the optical data communication to degrade severely or to fail altogether.

9. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Iwasaki* (US patent No: 5,034,997) in view of *Dorren et al.* (US patent No: 5,854,986) and further in view of *Dodley et al.* (US patent No: 5,966,229).

Regarding 10 and 11, *Iwasaki* teaches that a transmitter according to claim 8 and 9, respectively, wherein feeding an identical decoded signal to a modulator (Q2, Fig.3A) of the radio transmitter apparatus and to an electrical/optical converter (Q1 and optical diodes, Fig.3A) of the optical transmitter apparatus (13, Fig.3A). *Iwasaki* differs from the claimed invention in that *Iwasaki* does not teach a transmitter according to claim 8, wherein it further comprises a splitter and a laser transmitter. As discussed above, *Dorren et al.* and *Dodley et al.* teach the splitter and laser transmitter, separately. *Dorren et al.* teach how to use a splitter, such as Wilkinson power splitter, in cellular communication system (56, 58, 60, 62, Fig.2 and Col.4, lines 52-59) to split received radio frequency signal to two outputs. *Dodley et al.* teach a laser used in free space optical communication system. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate a splitter, such as the one of *Dorren et al.*, and a laser transmitter as taught by *Dodley et al.* to the wireless communication system modified by *Iwasaki* to split the decoded signal to two identical output signals connected separately with the RF modulator and electrical/optical

converter to drive RF transmitter and laser transmitter simultaneously with longer distance and capable to optimize the laser transmission for varying weather conditions.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to application's disclosure.

1. *Walker et al,* (US patent No. 5,659,883) disclose optical RF hybrid communication used to protect frequency interference.

2. *Chen* (US patent No. 5,946,120) shows a wireless communication system with a hybrid optical and radio frequency signal used to improve the accuracy and reliability of transmission of free-space optical digital communication.

3. *Zavrel,* (US patent No. 5,585,953) disclose a IR/RF radio transceiver and method for digital communication.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Leming Wang whose telephone number is 571 272 3030. The examiner can normally be reached on 8:00AM - 5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on 571 272 3112. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LW

JASON CHAN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600